Comments and Requests from the Leverett Conservation Commission regarding NOI #200-0916 (Organized by topic):

This version numbered by FLP for convenience and cross-referencing attachments. Consolidates attachments for Tessa.

A) General Questions

A1) How many members are there in FLP?

FLP: In 2020, based on contributors, there are 81 members, 63 are non-abutters, 19 are abutters. Please note that FLP became a registered US Treasury non-profit 501(c)3 organization in 1994.

A2) How many members are landowners around and/or directly on the pond?

FLP: 26 own houses, 9 own lots. This does not include Rattlesnake Gutter Trust, Town of Leverett, Leverett ConComm, or Cowls, Inc.

A3) How many members are getting hydrorake services on their waterfront?

FLP: This varies from year to year. In 2020 there were 11. Since the beginning of the project, it has ranged from 11 to 22 with an average of 15. This includes the Town which covers the Public Access. FLP organizes the hydro-raking. Abutters pay individually for the hydro-rake to Solitude Lake Management.

Or have been given weed hand rakes?

FLP: The Friends of Leverett Pond (FLP) does not buy garden rakes or give them to anyone. In a volunteer clean-up effort e.g., at the Public Access, FLP volunteers may loan a few rakes or other tools to volunteers who do not bring their own.

A4) What is the fee (if any) landowners/members pay for this service?

FLP: Not sure what "service" is being referred to here. There is no "fee" for FLP and it is not a service. Everyone who makes a donation and/or volunteers is considered a member. Membership is open to anyone who wishes to be one. If you are referring to a hydro-rake "service," Solitude Lake Management charges $200 per hour directly to abutters and the Town. Abutters pay additionally (separately) for removal of hydro-rake piles as needed. Most do this by hand. The Town Highway Department moves the pile from the Public

Access to the "stump dump" at the Transfer Station. Hourly rates for a mechanical harvester are comparable.

B) Invasive Plants/Herbicide Treatment

- B1) Analysis of survey data on extent of invasives (location, estimated area coverage) with special attention on current status.

  FLP: Two files are attached to this document.
  File Name: B1-B3-Digital Results of Treatment.docx
  B1-FLP-Weed-Management-Testing.pdf
  B1-B3-TBL-Herbicide-results-2018-2020.xlsx COMING

- B2) A **detailed map** showing treatment areas with information about pond structure (water depth, etc.), floating leaf vegetation (percentage or high/low concentrations) - could be included on the relevant/significant wildlife habitat map that is to be produced by a wetland consultant.

FLP: This will be prepared by FLP with help from the **CONSULTANT**. SEE WILDLIFE HABITAT BELOW - **CONSULTANT**

- B3) Assessment of the effect of the past treatments since 2018 based on plot sampling that Mitch has done/Results of treatment area surveys of 37 test and control sites.

FLP: See attached narrative. More will be available soon for Spring 2021. Plans are to test in June and will add additional Control Plots in deeper water. The actual spreadsheet can also be made available.

FLP: A WORD file and Excel summary table are attached to this document (see also B1 above – same file).
File Name: B1-B3-Digital Results of Treatment.docx SAME AS ABOVE
B1-B4-TBL-Herbicide-results-2018-2020 SAME AS ABOVE

- B4) A chart showing **all herbicides that have been used in the past and/or may be used in the future** and notes about their efficacy. *A tabular chart format is preferred to a narrative.*

FLP: An Excel File is attached to this document.
File name: B4-Herbicides-Used-in-Pond 1994-2019.xlsx

- B5) A **report of proposed BMPs** (referenced in the Plan or Report of 12-1-2019: *"after this 10th year, FLP will evaluate progress, report to the LCC, and propose continued BMPs")*

FLP: A WORD file is attached to this document.
File name: B5-C10-C11 BMP.docx

- **B6) Monitoring reports,** ideally to include:

  a. Water quality testing (both for DO and residual herbicide; also, testing for degree of eutrophication or algae growth)
  b. Impacts to nuisance aquatic vegetation (NAV)
  c. Impacts to non-target species
  d. Negative effect on native plant vegetation (waterlily, pickerelweed, arrowhead among others)
  e. Visual materials (before and after photos, for example)

  FLP: We believe this group refers to surveys that should be done if the NOI is approved. FLP agrees. This can be included in the Annual Reports perhaps in tabular format.

- B7) For future annual herbicide approvals, would like to see a detailed herbicide **treatment schedule** showing treatment areas, timing????, target species, and herbicides used.

  1) FLP – Not a problem. Already done in FLP's Annual Proposals. This is now provided with the Annual Proposal in February or March with the exception of *date* of treatment. That is not known until a couple of weeks before the treatment. This can be provided to the ConComm by E-Mail. The FLP also currently provides the ConComm with a statement and rough schedule of both herbicide and mechanical treatment that is published in the ConComm/Town web site. The areas to be treated are shown on the map that is drawn on a reduced copy of the Assessors map. Could be drawn on a USGS Quadrangle map instead. The FLP already provides the applicator with a USGS Topographic Quadrangle maps showing the areas to be treated, and the route to take (the latter chosen to avoid going into areas where

invasives could be spread to other parts of the Pond.) A copy of this map can be provided to the LCC digitally.

2) FLP now provides this information to the ConComm prior to treatment so that Tessa can publish it in the Town web site. Not sure what is meant by "timing" vs "schedule." Timing to correspond with weeds blooming or growth tips? or date of treatment? Note that this information is provided to Tessa for both the herbicide treatment and the hydro-rake.

- **C) Questions to answer/information to include:**

C1) Where are the different aquatic vegetation species/communities currently growing? And C2) What is the extent?

FLP: Two maps attached. Milfoil/invasives presence overlain on a bathymetric map and a map showing the presence of all invasive species along with shallow areas treated and shallow areas purposely not treated.

FLP: Two maps (jpgs) are attached to this document.
C1(a) C7 Map-all-invasives-presence.jpg
C1(b) Map-milfoil-presence.jpg

C3) Has there been any mapping besides anecdotal observations i.e. transect surveys?

FLP: Yes, but FLP does not presently conduct transect surveys over the whole pond. Not sure what you mean by anecdotal observations in mapping. Annually, the surveyor visits the area by boat to be treated, records observations and then after the fact produces a map from the results, generally overlain on a USGS Quad or Town Assessors map. This is provided to the applicator. Prior to the survey a "dinghy-over" of the whole Pond is conducted to look for new outbreaks.

A bathymetric contour map (see C1b Map-milfoil presence.jpg above) was based on 51 data points derived from past studies. McCann and Daly 1972, various UMASS Ecology papers, articles, etc.

In the 1990s when milfoil was first discovered, FLP made many detailed maps of weed species on the pond by sections, not transects. These were surveyed by trained FLP volunteers initially with the help of the Water Watch Partnership from UMASS Water Resources Research Center. They were used to inform management proposals and are on file with FLP.

Each year, before treatment, a visual survey of the whole pond with emphasis of the proposed treatment areas is always conducted before treatments. This is not documented in detail as is the new survey method which focusses on treatment areas and control points. Areas of invasive growth are plotted on a USGS Quadrangle map to guide the applicator (Solitude Lake Management, Inc.).

FLP has always conducted pre- and post-treatment "dinghy-over" surveys to determine how effective the treatment was and to provide info or modification for the next survey as needed. Since 2018, a more detailed formal survey records weed conditions before treatment and at the end of the season.

Following each herbicide/mechanical treatment survey, the applicator returns to the Pond and does a follow-up survey. FLP is charged for this. FLP rarely gets physical copies and FLP has asked Solitude Lake Management to send us the results each year. FLP data is more detailed.

Today (2021), FLP does the pre-treatment/post-treatment surveys designed by FLP and the ConComm (started in 2018) and will continue to do so annually whether herbicides are applied or not. The results also will be interesting if FLP is able to conduct a drawdown in the future. Based on the initial results data within treatment areas show a definite decline in targeted invasives after trreatment. FLP plans to add additional Control Plots because several of the existing control plots are too close to the "Test Plots." Results show that there is some effect on adjacent Control Plots slightly affecting the percentage of invasive weeds at those locations. The treatment boat comes closer to these locations than originally estimated. An additional group of Control Plots will be established more distant from the treatment area. See "B1-B3-Digital Results of Treatment" for more discussion. There are also some areas with new outbreaks of milfoil that should be monitored. Comparisons with herbicide and mechanical control? The data base accommodates this, but it has not been done yet. FLP is planning to add DO readings to those surveys. Sadly, our very expensive YSI DO meter stopped working. We have recently purchased another meter and look forward to putting it to work in the spring of 2021. Early DOs and other analyses were obtained in the 1990s in conjunction with the Water Watch Partnership. FLP has those records.

C4) If there has been any change in extent of aquatic vegetation and plant communities of species what are they?

FLP: ***Milfoil*** (mostly *Myriophyllum heterophyllum*) and some Eurasian

(*Myriophyllum spicatum*) - since 2011 there has been a slow, but steady decline in the volume of Variable and Eurasian Milfoil in areas treated with herbicides. Slow at first, but longer lasting when *Renovate Max G* was introduced in 2013, and a ***major*** and longer lasting reduction when *ProcellaCOR* was used in 2019. In areas where the hydro-rake removed the roots of milfoil, the reduction was more pronounced. This usually takes several seasons because the root systems of milfoil are extensive. There has been little to no impact on surrounding native vegetation. Herbicides are mixed (dosed) to impact the target species.

Swollen bladderwort (*Utricularia inflata*) established itself on the Pond in 2014 and has spread dramatically. This plant grows in the shallows, but once the bladders fill and the plant floats, bladderwort masses are windblown across the Pond into both shallow and deep water. They appear to have hybridized with Purple Bladderwort (U. purpurea) which is also a nuisance. Bladderwort is reasonably controlled in treated areas. Mechanical removal works well. Floaters must be removed by rakes or nets.

Curly-Leaf Pondweed (*Potamogeton crispus*) was first identified in 1978 in the northwest cove by MDEP limnologist Richard McVoy. It was one observation of the plant. There was no obvious outbreak until 2011 when the plant was found in a survey by FLP and Aquatic Control Technologies, Inc. in the center of the northwest cove (Assessors Map 5 Lot 5A-13 Camp Road). Within two years the plant was found in several areas of the Pond. This plant is easily spread by waterfowl. In 2017 and 2018 this plant, along with bladderwort were treated specifically with the herbicide Diquat with success.

Large Leaf/Floating Leaf Pondweed (*Potamogeton amplifolius and P. natans*) is a nuisance plant with cyclical infestation habits. Starting in 2018 this plant began to colonize the west-central shore of the Pond and is now extending into the middle. It had spread through the Pond along the shoreline in 2020. In moderate numbers this plant is beneficial to fish, but can become dense and a nuisance.

Brittle/European Naiad (*Najas minor*) was first observed in 2020 in only two places. It is odd the way the plant showed up suddenly and in just two locations, but is present and must be dealt with. Documented studies suggests that the weed spreads fast. The largest infestation (appx 1/8 acre) is in the northwest cove off Lots 5A-8 and 5A-10 and off the shore of Lots 5A-2 and 5A-4. This plant promises to become a major nuisance in the next year or so.

Waterweed (*Elodea nutalli and canadensis*) was first observed in the Public Access pool in September of 2020. The volume is low and it appears to be restricted to the Public Access pool. That will not last. This plant could have been introduced by boats or trailers. The plant hides in clusters of milfoil, bladderwort and curly-leaf pondweed. It is so localized at the moment that it could be controlled fairly easily with an herbicide. Lacking that, hydro-raking or hand-raking with a group of volunteers with garden rakes this spring could slow down the spread until herbicide treatment is available. Boaters of all types will carry this weed into the main pond and other waterbodies.

C5) What are the most effective measures to date to manage NAV?

Once an invasive plant is established in the Pond, most invasive aquatic plants that propagate vegetatively (cloning) (e.g. milfoil, naiad) require some herbicide management followed by removal of roots. This is especially true of milfoil. In low volume these weeds can be removed mechanically if "floaters" are removed manually. If growth is dense, mechanical methods will spread the plants. Follow up "skimming" can effectively remove floaters following treatment. Some plants like Swollen Bladderwort can be removed mechanically, or with garden rakes if the density is low. Removal of roots after herbicide treatments have killed the foliage is an effective way to limit regrowth.

Trying to limit the introduction of invasive weeds is a nice idea, but difficult to accomplish. These weeds usually become established before they are observed. No naturalist likes to think about it, but waterfowl are very effective vectors. There is plenty of literature on this topic. e.g., isolated ponds that have no people access, no fishing, and no boats These ponds have invasive milfoil and other invasive weeds brought in by waterfowl, especially Canada Geese because of their size and numbers and impressive ingestion volume, and of course the reverse. Boat trailers at boat ramps also bring in plant material from lake to lake. Believe it or not, even kayakers and other passive boaters can be vectors by cleaning boats at launch points, poor cleaning of fishing tackle, and especially paddles and oars, boat cleanout before reloading, etc. Motorboat use on Leverett Pond despite the recent uproar is very low. In a typical day 2-3 motorboats (mostly electric trolling motors) are seen on the Pond. Most gasoline powered boats come in the spring when the weeds are low. They are rarely on the Pond once the floating-leaf plants (lilies, watershield etc.) surface. It is minor traffic, but it is there. It only takes a tiny fragment of an invasive plant to start an infestation, especially aggressive weeds like milfoil and bladderwort. Some states have programs that hire monitors at boat ramps to inspect boats before they are

launched. In Massachusetts these are rare because of the cost. Quabbin Reservoir has some monitors and very strict entry rules. FLP uses cautionary/educational signage at the Public Access.

Once in a pond, milfoil must be controlled with herbicides or drawdown, or raking if the volume is low. Because the plant propagates vegetatively (cloning) mechanical harvesting or hydro-raking can spread the infestation unless the foliage is eliminated or reduced beforehand. Preceding mechanical control with an herbicide mixed/dosed to target a specific plant to eliminate (even if temporarily) the foliage and then to mechanically remove the roots is effective and provides more time before regrowth. The plant can be controlled, but **not** eliminated. Also, invasive plants grow aggressively regardless of water conditions.

Leverett Pond has no sewerage issues or fertilizer pollutants. This is commented upon in the D3 attachment *Watershed Survey Final Report & Action Plan 2003*). Since the time of the 2003 survey, most septic systems have been replaced with modern systems. There is no evidence of algal blooms, odors or other indications of a sewerage issue. There may be some non-point pollution from parked vehicles along Depot Road at the Public Access, although to-date obvious pollutants (oils, fuels) have not been observed. These pollutants are automotive and would not affect plant growth. Once established invasive grow aggressively throughout the Pond as they do in other lakes, rivers. etc.

A milfoil weevil (*Euhrychiopsis lecontei*) that feeds on Eurasian Milfoil has been used somewhat effectively in places outside of Massachusetts. Sadly, the beetle does not feed on Variable Milfoil which is the predominant milfoil on Leverett Pond. Introduction of the insect, as well as others to waters, is not legal in Massachusetts. For milfoil control the most effective herbicide is *ProcellaCOR* and is marketed as the safest of herbicides. Before *ProcellaCOR* was approved by the State of Massachusetts in 2019, the most effective herbicides to control milfoil were 2-4.D and Triclopyr. The herbicide *Navigate* (2-4.D) is still recommended for full pond treatment, but can work in smaller areas. FLP's experience with *Navigate* is that control is short-lived compared with other herbicides. *Renovate Max G* is a combination of Triclopyr and a smaller dose of 2-4.D. It is highly effective especially for one season. It does provide some relief from regrowth into a second year and an observable, if slow, decline. *ProcellaCOR* is marketed to last up to 3 years. This herbicide has been permitted in Massachusetts for agricultural purposes for about 10 years. It was only permitted for use in lakes and ponds in 2019. It is used regularly in Minnesota and Wisconsin and other states

with good results. Leverett Pond is in its second year following a *ProcellaCOR* treatment and milfoil regrowth is very low in areas treated.

It is important to remove roots and detritus following an herbicide treatment when possible. Hand raking occasional plants is very effective to slow regrowth.

Benthic barriers (pond mats) are effective for tiny areas and require substantial maintenance. There are 4 in use on the Pond, permitted under DEP 200-0166.

Timing of treatment is important with all herbicide applications. Milfoil is best treated as it begins to have growth tips in the spring, and water is above 60 degrees F. This is usually in May depending upon temperatures. Interestingly some growth has been observed on April 13, 2021! It is a very warm year. Weeds such as Curly-leaf Pondweed require treatment before the nut-like turions drop to the bottom in June. Bladderwort can be treated anytime, but for best results should be treated when bladders are filling. Bladderwort, which has no root system, is difficult to see in June, because the bladders have not yet filled. Curly-Leaf Pondweed, Bladderwort and others can be removed mechanically followed by manual removal of floaters.

A winter drawdown is an effective, non-herbicide method for controlling invasive weeds. Most invasive weeds grow in the shallows and are particularly susceptible to freezing. Milfoil grows in less than 5 feet of water, but there are minor exceptions. Flood gates on the dam would be opened slightly in late fall to allow the pond level to lower ***very*** slowly. This allows fish, amphibians and other wildlife to move to deeper water. Once the pond level reaches the desired depth (4 feet in Leverett Pond) the gates are closed and the Pond is allowed to refill. The pond is expected to refill over the winter. Leverett Pond is spring-fed and has refilled in the past quickly following drought or dam leakage. In 2019, the pond level was 24 inches lower than normal because of drought and a very leaky dam. Once the dam was replaced in October, the pond refilled in less than one month despite droughty conditions. FLP plans to apply for a permit for drawdown in the near future, perhaps being added to DEP 200-0196. Anticipating that this may take some time. The current proposal under DEP 200-0196 will help keep invasives under control and not lose the headway made over the past 10 years.

Native plants that tend towards monocultural growth (e.g. watershield, lilies, cattails, Decodons/Loosestrife, etc.) can become nuisance plants if they grow in high volume and outcompete other species. Floating-leaf weeds such as watershield and lilies can cover 100 percent of the surface if unmanaged. They

shade the water column and make poor fish habitat. They can best be controlled mechanically if in a small area. Herbicides also work, but the roots of these plants are extensive and should be removed mechanically after a treatment, so it is more cost effective to just remove them mechanically in the first place. Management of small quantities of a weed within areas of widespread growth of that weed species has little impact on the overall weed population. For example, FLP has recommended removing a small patch of cattails (a native plant) at the shore edge of the Public Access. This small patch has grown just in the past 3 years to partially block the small stream that feeds the only fire hydrant on the Pond and a picnic area. The plants cover an area of 24 by 10 feet and can be removed by a hydro-rake or a land-based backhoe. Compared with the many acres of cattails that dominate the southern end of the pond, this will cause little impact to the species.

C6) How do you protect against introduction of new NAV?

FLP: This is difficult to accomplish. If boating traffic and trailers are excessive it could be monitored or even disallowed. Because Leverett Pond is classified as a "Great Pond" the town would have to establish a bylaw prohibiting motorboats. This would have to be approved at town meeting. Here's the hard part: *Compliance* would have to be built in. A "Harbor Master" has been discussed in the past (proposers were accused of having delusions of grandeur); as have volunteers working from 5AM to dark to monitor uncooperative fisher-folks. Volunteers are not available to do this and motorboat use is very low on Leverett Pond in comparison with other waterbodies (e.g., Lake Wyola). Most gasoline-powered boats use the Pond in the early spring before the weeds surface. All boats, even kayaks and canoes, fishing tackle, and paddles and oars can introduce milfoil and other invasives. It is not practical to have someone stand out at the Public Access all day; there are no volunteers willing to do this; and undoubtedly few boaters willing to stand for it. If monitors were paid, the cost would be prohibitive. Even the Commonwealth does very little boat-ramp monitoring. One very productive vector that the naturalist in all of us does not want to talk about is waterfowl. Here's one of many discussions available regarding Canada Geese:

> Each **goose** produces 1 to 3 pounds of waste per day. In addition to phosphorous, they contribute pathogens such as e-coli and the bacteria that cause swimmer's itch, as well as giardia, cryptosporidium, and campylobacter. **Geese** are one **vector** for the spread of invasive plants such as **milfoil** and **water** chestnut. (threelakescouncil.org)

Control of Geese is extremely problematic.

C7) How do you calculate the size of the treatment area and determine the location of treatment areas?

Treatment of invasives off infested shallow waterfronts and the Public Access results in removal of invasive weeds just as effectively as would treatment in infested non-waterfront areas. The areas treated are used regularly by the fishing community which may have a positive impact on the stunted fish growth issue. People who fish on the Pond report improved fishing in these areas because of edge. Birds that prey on fish are often seen fishing from trees abutting these areas. Add up the shallow shoreline that contains milfoil at the shallow Public Access and waterfronts areas. Areas where herbicides are applied avoid areas of deep water (greater than 4 feet depth) because they have very little vegetation, and avoid venturing into areas of native vegetation (like lilies), or areas where little to no invasive plants are located. Shallow areas at the Public Access and waterfronts are as infested with invasives as are similar areas that are not waterfronts. Treatment of waterfronts and the Public Access provides edge to treated areas in recent years. Fisher-people are regular users as well. A rather busy map is attached that shows the areas chosen for treatment along with size of areas. Areas to be avoided are:

- the north swamp edge and coves,
- the northeast area that has bedrock that interferes with weed growth,
- the southern swamp edge where there is no to little milfoil,
- patches of floating-leaf vegetation that abut the shore;
- and an area where the abutter did not want treatment.

Most of the areas not treated are avoided on purpose for reasons stated. There are only 700 feet of non-treated areas that are not avoided on purpose. They are in between some treatment areas.

FLP: A jpg map is attached to this document.
C1(a)-C7 Map-all-invasives-presence.jpg
H1-H6-milofil with treatment areas.jpg.

C8) Who is conducting post-application monitoring of treatments (herbicide and hydro raking) and how (where) are monitoring reports being made available?

FLP: Presently Mitch Mulholland conducts pre- and post-treatment surveys and data entry. Tom Hankinson is handling the analysis. At Ralph's suggestion, FLP is trying to find a non-FLP, qualified wetlands person (perhaps a grad student studying Wetland Science at one of the colleges) to do the surveys. FLP would cover the cost. FLP has been in contact with Dr. Allison Roy, a professor of Ecology at UMASS and Leverett resident. There presently are no graduate students that are studying this topic. Unfortunately, a wetland student (Jason Carmigniani) recently earned his PhD in Roy's program, now works for NHESP (endangered species) in Boston. That student recently wrote his dissertation on Pond drawdowns in Massachusetts and FLP hopes to get his advice when a drawdown NOI is prepared in the future. Solitude Lake Management also conducts follow-up surveys. Detailed results have not been provided to FLP. FLP is requesting written results for future management.

Comparative monitoring reports from FLP's surveys are only now available for the ConComm because of the short time the survey has been conducted. They will be provided to the ConComm annually. Other techniques such as DO analysis and probably pH are being added.

C9) How do you ensure that hydro raked plant material removed from the lake is properly disposed of? (farther than 100' from the shore) *(removal referred to in the Dec 1 2019 report).*

FLP: An FLP member (usually Mitch) follows up with abutters once the piles are dry. The Town is easy because the Public Access is raked first, and the pile is left on the end of the boat ramp or Public Access lawn and the Highway Department removes it right away. Otherwise, the hydro-rake would be stranded on Leverett Pond. A one-sheet Hydro-Rake flyer is given to all people using the hydro-rake with instructions. That is provided at the end of this document. Hydro-rakers whose piles are not removed once dry are contacted and reminded. Several abutters use landscaping companies to remove the piles off-site to a "stump dump" or contractor's yard. FLP does not have a record of those physical locations. Most are out of town. FLP is trying to find a contractor who would come each year and remove the piles, but has not yet found one. Actively working on it. In the early years of the 2010-2020 DEP 200-0166 weed management project a group of young people worked each year removing the piles with buckets and wheelbarrows to the disposal areas, or to the roadside so that contractors could remove the piles. They were wonderful, but are no longer available. They are now employed painting parking lot lines!

A map of pile locations can be provided to the ConComm in future. Solitude provided an example to FLP. They use a Google Earth base map for the treatment locations and storage areas. FLP could use the same format if that works for the ConComm.

C10) What Best Management Practices have you identified over the past 10 years?
C11) Which BMPs have been effective? How do you know this effect (i.e. anything besides anecdotal observation)?

FLP: See attached WORD document,
File name: B5-C10-C11-BMP.docx

- **D) Questions/Comments regarding cause of invasives/invasive spread**

D1. Recognize that there are likely problems with motorboats as a source of invasives (no one to monitor condition of boats prior to their entry) and that once in may promote fragmentation of invasives (in the area mentioned - near the launch) and expansion of the species elsewhere in the pond.
D2. Are there protocols you might put in place to reduce the risk of spread of invasive species potentially introduced by boats and boat trailers?

FLP: As discussed above, this is difficult and even the State has trouble funding efforts to do this. If boating traffic is excessive it could be monitored or even disallowed. In Leverett Pond, trailered boats are *few* compared with most lakes. Because Leverett Pond is categorized as a "Great Pond" the town could establish a bylaw prohibiting motorboats. This would have to be approved at a town meeting. Compliance would have to be built in (e.g. police department). A Harbor Master has been discussed (FLP was accused of having delusions of grandeur!), also volunteers working from 5AM to dark to monitor uncooperative fisher-folks are hard to come by. Compliance and its cost are impractical. Signage is the chosen solution. Readable signs warning of the potential to spread are posted on the informational kiosk at the Public Access, as well as signs produced by Mass DEM (today DCR).

FLP plans to post small buoys around a recent milfoil infestation that is at the lake end of the channel from the right of way. Weighted red water bottles surrounding the area with a central sign indicating "Milfoil." If FLPs Notice of Intent is approved, this area should be treated with *ProcellaCOR*. This area and others will be added as an annual Survey Control Plot initially, and hopefully if approved by the ConComm a Test Plot.

D2 part 2. Plan P6. Also, please provide more details on mechanical cutting and harvesting – boat size, speed, etc.

a. Cleaning practices?
b. Size/speed regulations?
c. Time of year regulations (limited use during growing season?)

FLP: Do not understand this. Size, speed of harvester? And regulations of same? Need additional info on this.

All mechanical equipment is cleaned at the Shrewsbury yard by Solitude before coming to Leverett Pond. FLP meets the boat at the ramp and assures it is clean.

D3. Given that much of the research on causes of eutrophying of shallow lakes and management approaches focuses on controlling nutrient and sediment inflows, what actions are being taken to reduce the problem at the source?

FLP was part of a DEP/Lake/Watershed Stewardship Program study in 2003 that studied the potential for pollution, especially non-point pollution. Attached – see D3 watershed Survey. The surveyors included FLP members and a Leverett Conservation Commission member (Ralph Tiner and his son). Other members included Rich Brazeau of DCR, then also a Leverett Select Board member, Marie Francoise Walk of the Massachusetts Water Watch Partnership Program and several FLP members. It was concluded that the area with some potential for nonpoint runoff from vehicles was parking at the Public Access. This was considered not to be a problem. Introduction of fertilizers was nil. Lawns around the Pond are rustic and most have a plant buffer. Concluded not a problem. A study by FLP (with help from the Water Resources Research Center at UMASS) of phosphorus in the Pond, targeted septic pollutants. This study revealed findings of "Below Detectable Limits" for all but one test area and that was by a horse pasture on the east shore. The latter was also discussed as a part of the Watershed study mentioned above. The single reading was barely above detectable limits and determined not to be a problem. There are no horses in that area in 2021.

FLP: A pdf report is attached to this document.
File Name: D3-Watershed-Survey.pdf

Note: hard spiral bound copies of the Watershed report are in a box in the ConComm Office on top of one of the file cabinets. Box is labelled "POND."

D4. What is the management of the surrounding land such as lawns and gardens?

Landowners are discouraged from using fertilizers in any area that could reach the Pond. In general, lawns are rustic. No fertilizers are used to FLP's knowledge. Lawn owners are encouraged to keep a reasonable vegetative buffer to inhibit sediment runoff into the Pond. Solitude Lake Management personnel often comment about Leverett Pond's rustic nature in comparison with other lakes. The DEP Watershed study found "Most residences have lake-friendly landscaping with adequate vegetative buffer" (DEP 2003:4). The Leverett Highway Department does not use fertilizers at the Public Access.

D5. How much area surrounding the pond is in lawn, mowed and potentially fertilized?

There are 14 mostly rustic lawns including the Public Access and the Rattlesnake Gitter Trust property. Most lawns are buffered by a narrow native plant area along the shore. Lawns are mowed (mentioned in D3 – Watershed Survey, page 4). None are fertilized. With the exception of one lawn most are quite small (e.g.50x80', 100x50', 15x50' 60x20', etc.). Adding up the *approximate* sizes there is a total of less than 1.5 acres of lawn around the Pond. There is one small vegetable garden on the east shore that is buffered from the Pond. Solitude Lake Management operators often comment about Leverett Pond's rustic lawns and shoreline compared with other lakes.

D6. How many homes and cabins have septic systems that haven't been replaced, inspected, or upgraded over the last ten to twenty years or more years?

Most systems are recent septic-tank/leach fields. A few are tight tanks. Possibly 3 seasonal cottages have earlier systems, but are infrequently occupied. Not sure about the details of the systems though. To provide exact numbers would require researching information from the Board of Health. There is no evidence of a sewerage problem on the Pond. No resulting algae, odors, etc.

D7. What data is available about nutrient and sediment inflows to the pond?

As discussed above, FLP was part of a DEP study in 2003 (see Attachment D3 Watershed Survey) that dealt with this topic (DEP 2003). DEP personnel (Chris Carney of the Lake/Watershed Stewardship Program and Riverways Programs of MDFW) and Tracey Miller of MDEP served as advisors on the project and volunteers included FLP members and Leverett Conservation Commission (Ralph Tiner and his son). Concluded not a problem. There are no sediment inflows to the Pond beyond a tiny stream at the Public Access. That is the only perennial stream and is partially blocked by a recent growth of cattails. One potential for non-point pollution from automobiles was the parking area along Depot Road at the Public Access, but was not of concern at that time. There is no observable automotive oils entering the Pond at that location.

*E) Wildlife – FOR **CONSULTANT***

General

- E1) A **detailed map** showing relevant/significant wildlife habitat and "wildlife safety zones" (referred to in report of Dec 1, 2019)- could be included on the invasive plant map

TO BE DONE BY THE FLP'S CONSULTANT AFTER HABITAT ASSESSMENT

E1a) Your report indicated NHESP/MESA may have a more detailed bathymetric map and it would be good to get this.

FLP has the NHESP map. It is attached. Unfortunately, it does not have more detailed contours. The NHESP/MESA map has a 5-foot contour resolution that may have been partially derived from a 1972 survey (McCann and Daly, 1972). FLP is researching this to be sure. The NHESP/MESA map indicates the Pond is 95 acres in size, compared with the 102 acre size derived by an FLP consultant in the 1990s (based on a color-infrared aerial photo taken in 1993). The NHESP map was taken from satellite data in 2015, a year of low water. FLP will provide the ConComm with its combined map which has more detailed contours, as well as the MESA/NHESP map. Note: FLP plans to add additional shallow depths to the bathymetric base during the 2021 survey season.

Two maps are attached to this in response to the E1a question:

File Name: E1a-NHESP-bathymetric-map.jpg
E1a-FLP-bathymetric-map.jpg

- A **wildlife habitat assessment** of Leverett Pond conducted by a qualified, outside wildlife habitat evaluator.

TO BE DONE BY THE FLP'S CONSULTANT

F) Fish

- F1) If FLP wants to emphasize improving fish habitat for a grant???? NOT SURE WHAT THE GRANT IS MAYBE A TYPO?, need to document the problem, possible solutions (alternative analysis), and why you chose the one you are interested in.

  FLP has been in touch with Massachusetts Fisheries and Wildlife (Brian Keleher) and a fish shock-boat study is planned for June or July 2021. Conditions of the fishery and our channelization argument will be informed by this study. FLP will get help from its **CONSULTANT** concerning the presentation of results. It will be interesting to compare the results with those done in 1981 and 1994. According to Kelleher, no studies have been conducted in the interim.

- F2) An **updated fish survey** (last one conducted by MA FWS in 1994)

  Ditto - **CONSULTANT**

- *F3) From Plan P 12: "The FLP plans to request from the Massachusetts Department of Conservation and Recreation, that a fisheries study be conducted similar to that conducted in 1994. The study will be used to compare to previous studies conducted on the pond."*

  Ditto **- CONSULTANT**

- **F) Questions**

  F4 (old F1)) What is the current condition of the fish population and aquatic plant and animal foodweb?

  This will be answered following the shock-boat study. See F2 and F3

  F5 (old 2) Has there been any study since 1994?

  No, according to Brian Keleher of MDFW. See F2 and F3

  F6 (old 3). On what basis are management practices being undertaken without some level of surveys and monitoring?

  FLP: None. Surveys to identify weed infestations precede all herbicide and mechanical treatments. Results are surveyed again at the end of the season. FLP provides a detailed topographic map to the applicator (Solitude Lake Management) for both herbicide and

hydro-rake treatments. Initially an FLP member rides the airboat around the Pond to physically show the operator what has to be treated, carefully referencing the provided map. Following this, the FLP member monitors the entire application by boat to assure the proper areas are treated, and to assure that no boaters or swimmers are in the area. An FLP member meets the hydro-rake at each area to be treated, coordinates with the abutter and follows up regarding disposal. The airboat and hydro-rake are met at the Public Access when they arrive to assure there are no obvious weeds attached to the trailer or vessels. Note that Solitude Lake Management returns their treatment vessels to the Shrewsbury yard for power-washing before going on to another lake. In the past FLP has not found weeds attached to any of Solitude's boats or trailers.

G. Recreation in connection to Invasive Plants and Wildlife

G1. The focus of the management appears to be at the waterfronts of landowners for primarily recreational purposes. The new effort to clear channels seem conspicuous in that they will provide access specifically through the aquatic vegetation (including areas of native plants) from the shallow western edge and waterfronts that are being cleared and hydroraked. On what basis were these channels located?

FLP: First, the management of invasive species in shallow water areas transcends recreational motives. Regarding channels in floating-leaf vegetation, mostly based on 1990s locations that were chosen to allow circulation, improved DO and improved access for fishing. They *do* connect where possible with west-shore hydro-raked areas to add a more continuous edge and return. The channels are *not* "*primarily*" for recreational purposes, but do have that added benefit. As discussed in the NOI, they are for improved edge, light and circulation that will improve the fishery as well as provide access. 40 percent of the Pond is now covered with floating-leaf vegetation. This is not good for the fishery. And…N.B. access for fisher-people is an advantage for trying to cope with the stunted growth of fish observed by the MDFW Fish studies of 1981 and 1994.

G2) Is there any research you can point to for this or other ponds that channels are needed for fish passage?

FLP is researching this – WILL ASK **CONSULTANT AND FISHERIES EXPERTS**. Channels are proposed for water circulation, improved dissolved oxygen, access, and of course fish use.

G3) Why this configuration and is there a more strategic approach to assisting fish habitat you can utilize?

WILL ASK CONSULTANT AND FISHERIES ESPERTS. *FLP is aware of a grid approach to reducing thickets of floating leaf vegetation, but this is more extensive than what FLP proposed. Still, it may be a possibility. Worth researching.*

H) Specific Comments/Questions to NOI

- H1) All maps and documents should be dated and cite source of information.

FLP: Done. See next response.

The map of milfoil extent shows little hash marks in various areas denoting 'milfoil'. Is this occurrence? It seems to be the same one presented over the last years. Has the "approximate area" remained the same?

FLP: The map shows *presence* of milfoil in 2010. This will be stated in the caption. The attached map shows observed milfoil based on 5-foot contour with general areas of treatment indicated. More detailed maps based on USGS Topo maps have been prepared and will replace those in the original NOI submittal. And Yes. The overall areas of infestation have remained similar. There have been a few new outbreaks such as the acre-sized milfoil infestation at the north end of the Public Access channel. There has been a substantial reduction in volume of invasive plants within treated areas as a result of management. This map also shows the general areas of treatment. Remember that once milfoil and other invasives colonize a pond, they are difficult if not impossible to eradicate. Management of some sort will always be necessary to keep them reduced in volume and under control.

FLP: A map is attached to this document.
File Name: H1-H6 Milfoil with Treatment Areas.jpg

- H2) Delete mentioning "unhealthy" condition of the pond unless FLP provides evidence from an independent aquatic scientist (possibly with review from the state's limnologist) that the pond is currently unhealthy and offering a suite of suggestions for improvement - one or more of which will be adopted by FLP in their management plan.

Will get advice from **CONSULTANT** on this as well as fisheries experts and others.

- H3) From Plan P page 3 *"In addition, based on recommendations of the Massachusetts Division of Fisheries and Wildlife (Basler 1994), as many as five narrow (15-20-foot-*

wide) channels will be cleared of floating leaf vegetation using a hydro-rake and/or harvester." A more current recommendation would be relevant.

Will get advice from **CONSULTANT** on this as well as fisheries experts and others.

- H4) Some of the materials requested earlier in this document will help in creating a better understanding of the relationship between wildlife habitat and fishery "enhancement" proposed in this project and a statement to the effect that *"Some native plants (such as water-lilies, watershield, large-leaf and floating-leaf Pondweed, and cattails) also are considered where they interfere with the fishery."*

Will get advice from **CONSULTANT** on this as well as **FISHERIES EXPERTS** and others.

- H5. The map of milfoil extent shows little hash marks in various areas denoting 'milfoil'. Is this occurrence? It seems to be the same one presented over the last years. Has the "approximate area" remained the same? (This appears to be a duplicate).

FLP: Yes. The approximate area has remained the same with the exception of a large area at the north end of the boat channel. Volume of milfoil has decreased in treated areas. This map shows presence/location of milfoil regardless of treatment. This figure will be kept, but the caption will make clear what it is. Treatment has reduced the volume in treatment areas considerably, but there is still presence however small in volume.

See Attachment H1-H6 Milfoil map with treatment areas, and Maps C1(a) and C1(b). Two of the maps have been provided showing treatment areas. One on a bathymetric contour map and the other showing the location of all invasives.

- H6) Please be more specific in quantifying removal of surface vegetation including cattails. Plan P3 "*Removal will involve only a small number of plants."* (Is a small amount 1%? 10%? of an area approx. 10'x40'?) Also, specify how cattails will be removed.

FLP: The area of proposed removal is *new* growth of cattails since 2018 and is approximately 24 by 8 feet in area (see attached H6 Hydrant Area Figures 1, 2 and 3). 100%of that small area will be removed. As proposed, cattails will be removed by the hydro-rake which will already be on site. They could also be removed by a backhoe if that were necessary. The cattails immediately abut the shore. There is a smaller area of thin, but growing cattails within the brook of 10x8 feet that could be removed by hand if done soon. The cattails within the brook will soon block its flow. This brook is a water

source for a fire hydrant on the side of Depot Road. That hydrant is now dry because of sediment and blockage. Removing this small area of cattails will facilitate improvement of the hydrant and will also benefit recreational use of the picnic table which is now also blocked. This area could be cleaned as a part of the Fire Department's emergency needs, but will require a substantial amount of effort on their part. It will also be beneficial to keep this small area clear of cattails until the hydrant issue can be remedied sometime in the future. Removal by the hydro-rake which will already be on site will take about 10 minutes.

FLP: Three figures are attached to this document in one jpg.
File Name: H6-hydrant-area.jpg

ATTACHMENT – FYI (an example)
IMPORTANT HYDRO-RAKING INFORMATION
Estimated dates: Tentative – THURSDAY June 11, 2020
Weather dependent

As a part of the Friends of Leverett Pond (FLP) permit (DEP 200-0166) and approval of the Leverett Conservation Commission, a Hydro Rake will clean roots of invasive and nuisance vegetation from various areas near the shoreline of Leverett Pond. This is supported by the individual landowner. Of particular focus are *roots* from dead *milfoil* from this and last year's treatment, and selected plant mass of invasive/nuisance plants such as *curly leaf pondweed, large leaf (floating) pondweed* and swollen *bladderwort*. The proposed schedule is **a launch at the town right-or-way (ROW) sometime on THURSDAY, JUNE 11, 2020**. Note that the NOAA forecast is for thunderstorms that day and this could delay the launch date and/or time. FLP will let you know what the exact schedule is as soon as we know it. This will not interfere with boating, fishing, swimming or other pond use except in areas when being actively raked.

We will keep you informed by E-Mail and/or phone as the schedule changes. It will undoubtedly change daily because of equipment issues and storms. The rake should be here for about 2 days weather permitting. It is available to all those who signed up. Hours can be added if time is available.

The rake is owned and operated by SOLitude Lake Management, Inc. of Shrewsbury, MA. The weed removal will be and has been conducted under Massachusetts Department of Environmental Protection (DEP) - Wetlands Protection Act Permit #200-0166, and approval of the Conservation Commission;

WHAT YOU NEED TO KNOW ABOUT THE HYDRO-RAKE:

- The hydro-rake will remove roots and weeds from the bottom, and reduce plant and root mass. Raked roots and muck will be placed on your shoreline for later removal (see below). Note that last year's herbicide treatment was very successful and milfoil regrowth in treated areas is very limited at present. However, roots still remain and should be removed. Have the hydro-rake rake any areas of known milfoil infestation. Also, *the other three invasive plants (see above) are a problem, but can be controlled mechanically without herbicides.* Note: Hand-raking, if you see milfoil coming back, hand-rake it right away throughout the year. It is a very good practice to pick up floating plant fragments after the raking. Kayaks are great for this. Use the back of a lawn rake or a swimming pool net. Move the removed weeds as indicated below.

- The cost of the hydro-rake this year is now $200 per hour (Up $5 from last year. *This is payable by you to Solitude Lake Management. Checks are best. Payment should be given to the operator at the time of the raking.* Or, you can make an arrangement in

advance with Mitch Mulholland (413-548-9161) to pass along your check for delivery via him to the operator.

- Ideally, you should be there at the time the operator arrives. If possible, when the operator (Keith) arrives at your shore, let him know where the dense infestations of milfoil are/were, and ask him to vigorously rake out the roots in locations off your shoreline that you are aware of. Milfoil may not be visible to the operator because of the earlier herbicide application (2019). The foliage will not be there, but the roots will. Mark the specific areas with weighted soda bottles, or verbally point them out to the operator. This will provide longer lasting relief from re-growth. *Please mark the left and right edges of the area you want to have raked, if possible using the* ***provided surveyors' ribbons****.* Mitch will distribute these.

- The hydro-rake operator will place raked weeds on your shore. *Please clearly mark this deposit area in advance (such as with brightly colored surveyors' tape.) FLP will provide the tape in advance.* Place the tape on a stake in the ground so that it is visible from the water. **Important: according to our permit, initially the weeds should be placed as far back from the shore as possible. Allow them to dry out for a few days.** It is highly recommended that you place a tarp on the ground to place the weeds on. This will also facilitate recovery of the grass and will facilitate drying. One of those plastic tarps available at the hardware store will do the trick. Dark brown tarps are less unsightly and are dark enough to speed up drying (and eliminate rainfall). This will allow the weeds to dry out faster especially if the ground is wet. **THEN REMOVE THE WEEDS TO A POINT 100 FEET OR MORE FROM THE POND OR WETLAND (AND NOT INTO ANOTHER WETLAND). IMPORTANT: Per our permit, the Conservation Commission requires that the weeds be moved within 30 days, but *does* allow time for adequate drying. Failure to remove the piles from the waterfront could jeopardize future permits. REMOVAL OF THE PILE IS NOT INCLUDED IN THE HYDRO-RAKE PRICE. YOU ARE RESPONSIBLE FOR THOSE COSTS.**

- If you need help with removal of the weed pile let Mitch know. FLP is trying to find contractors to help with this and will let you know. Let Mitch Mulholland know by E-Mail or phone if you need help, and the best way for him to contact you.

- If you have **fabric pond mats** (benthic barriers) off your shore, please either remove them, or **clearly mark them**. If you remove them, consider raking their footprint after removal to reduce gases. You don't want the hydro-rake to damage them.

- **Important! If you can, pick up any floating weeds you see following the raking. A garden-variety broom rake works well. This can easily be done by boat or swimming or just walking the shore. Kayaks with swimming pool nets or rakes are great for this.**

Thanks.

Mitch Mulholland, FLP
Any questions, contact: E-Mail mulholland@anthro.umass.edu. Home: 413-548-9161
Cell phone 413-531-2730 (iffy if I am in Leverett)